C L A I M S

1. A method of controlling the production of a liquefied
natural gas product stream obtained by removing heat from
natural gas in a heat exchanger in which the natural gas
is in indirect heat exchange with expanded heavy mixed
5   refrigerant and expanded light mixed refrigerant, which
method comprises the steps of:

a)   measuring the temperature and the flow rate of the
liquefied natural gas product stream and measuring the
flow rates of the heavy mixed refrigerant and of the
10   light mixed refrigerant;

b)   selecting the flow rate of one of the refrigerants
(the heavy mixed refrigerant, the light mixed refrigerant
or the total mixed refrigerant) to have an operator
manipulated set point, and generating a first output
15   signal for adjusting the flow rate of the heavy mixed
refrigerant and a second output signal for adjusting the
flow rate of the light mixed refrigerant using (i) the
operator manipulated set point for the flow rate of the
one of the refrigerants, (ii) the flow rates of the heavy
20   and light mixed refrigerants and (iii) an operator
manipulated set point for the ratio of the flow rate of
the heavy mixed refrigerant to the flow rate of the light
mixed refrigerant;

c)   adjusting the flow rates of the heavy mixed
25   refrigerant and the light mixed refrigerant in accordance
with the first and second output signals;

d)   determining a dependent set point for the ratio of
the flow rate of the liquefied natural gas product stream
to the flow rate of one of the refrigerants such that the
30   temperature of the liquefied natural gas product stream
is maintained at an operator manipulated set point, and

determining a dependent set point for the flow rate of
the liquefied natural gas product stream using (i) the
dependent set point for the ratio of the flow rate of the
liquefied natural gas product stream to the flow rate of
5   the one of the refrigerants and (ii) the flow rate of the
one of the refrigerants; and
e)   maintaining the flow rate of the liquefied natural
gas product stream at its dependent set point.
2.   The method according to claim 1, wherein controlling
10   the flow rate of the liquefied natural gas product stream
according to step d) is overridden by determining a
dependent set point for the flow rate of the liquefied
natural gas product stream such that the temperature of
the liquefied natural gas is maintained at an operator
15   manipulated set point.
3.   The method according to claim 1 or 2, wherein step b)
comprises selecting the flow rate of the heavy mixed
refrigerant to have an operator manipulated set point,
generating a first output signal for adjusting the flow
20   rate of the heavy mixed refrigerant using the operator
manipulated set point for the flow rate of the heavy
mixed refrigerant, generating a second output signal for
adjusting the flow rate of the light mixed refrigerant
using (i) the flow rates of the heavy mixed refrigerant
25   and the light mixed refrigerant and (ii) an operator
manipulated set point for the ratio of the flow rate of
the heavy mixed refrigerant to the flow rate of the light
mixed refrigerant.
4.   The method according to claim 1 or 2, wherein step b)
30   comprises selecting the flow rate of the light mixed
refrigerant to have an operator manipulated set point,
generating a second output signal for adjusting the flow
rate of the light mixed refrigerant using the operator
manipulated set point for the flow rate of the light
35   mixed refrigerant, and generating a first output signal

for adjusting the flow rate of the heavy mixed refrigerant using (i) the flow rates of the heavy mixed refrigerant and the light mixed refrigerant and (ii) an operator manipulated set point for the ratio of the flow rate of the heavy mixed refrigerant to the flow rate of the light mixed refrigerant.

5.   The method according to claim 1 or 2, wherein step b) comprises selecting the flow rate of the total mixed refrigerant to have an operator manipulated set point, and generating a first output signal for adjusting the flow rate of the heavy mixed refrigerant and a second output signal for adjusting the flow rate of the light mixed refrigerant using (i) the operator manipulated set point for the flow rate of the total mixed refrigerant, (ii) the flow rates of the heavy and light mixed refrigerants and (iii) an operator manipulated set point for the ratio of the flow rate of the heavy mixed refrigerant to the flow rate of the light mixed refrigerant.

6.   The method according to any one of the claims 1-5, wherein the one of the refrigerants in step d) is the heavy mixed refrigerant.

7.   The method according to any one of the claims 1-5, wherein the one of the refrigerants in step d) is the light mixed refrigerant.

8.   The method according to any one of the claims 1-5, wherein the one of the refrigerants in step d) is the total mixed refrigerant.

9.   The method according to any one of the claims 1-5, wherein step d) comprises generating an output signal using (i) an operator manipulated set point for the ratio of the flow rate of the liquefied natural gas product stream to the flow rate of one of the refrigerants and (ii) the flow rate of the one of the refrigerants; generating a second output signal using an operator

manipulated set point for the temperature and the
measured temperature; and multiplying the output signals
with a weighting factor and adding the weighted signals
to obtain a dependent set point for the flow rate of the
5   liquefied natural gas product stream.
10. The method according to claim 9, wherein the one of
the refrigerants is the heavy mixed refrigerant.
11. The method according to claim 9, wherein the one of
the refrigerants is the light mixed refrigerant.
10   12. The method according to claim 9, wherein the one of
the refrigerants is the total mixed refrigerant.
13. The method according to any one of the claims 1-12,
wherein the mixed refrigerant used to remove heat from
the natural gas is compressed by a compressor driven by a
15   suitable driver, which method further comprises the steps
of measuring the power delivered by the driver, and
overriding the operator manipulated set point for the
flow rate of one of the refrigerants of step b) if the
power has reached a predetermined maximum value, in order
20   that the operator manipulated set point for the flow rate
of one of the refrigerants can no longer be increased.
14. The method according to claim 13, wherein the driver
is a gas turbine, and wherein the temperature of the gas
at the exhaust of the gas turbine is used as a measure of
25   the power of the driver.
15. The method of controlling the production of a
liquefied natural gas product stream obtained by removing
heat from natural gas in two parallel heat exchangers,
wherein in each of the heat exchangers the natural gas is
30   in indirect heat exchange with expanded heavy mixed
refrigerant and expanded light mixed refrigerant, wherein
the liquefied gas from the two heat exchangers is
combined to form the liquefied natural gas product
stream, wherein the flow rates of the refrigerants
35   supplied to each of the heat exchangers and the

temperature and the flow rate of the liquefied natural
gas product stream are controlled by the method according
to any one of the claims 1-14, and wherein the flow rate
of one of the refrigerants referred to in step d) is the
sum of the flow rates of this refrigerant to the heat
exchangers, which method further comprises the steps of:

1)   allowing the liquefied natural gas from each of the
heat exchangers to pass through a conduit provided with a
flow control valve, and measuring the two flow rates of
the liquefied natural gas flowing through the conduits;

2)   fully opening the flow control valves, selecting the
valve through which, when fully opened, the flow rate of
the liquefied natural gas is smallest, and keeping that
valve at its fully opened position;

3)   determining a dependent set point for the flow rate
of the liquefied natural gas flowing through the conduit
provided with the other valve such that this flow rate
equals the measured flow rate of the liquefied natural
gas flowing through the conduit provided with the valve
at its fully opened position; and

4)   maintaining the flow rate of the liquefied natural
gas from the second heat exchanger at its dependent set
point.

16. The method according to claim 15, wherein step 3)
comprises determining a dependent set point for the flow
rate of the natural gas flowing through the conduit
provided with the other valve using the measured flow
rates of the liquefied natural gas from the first and
second heat exchangers, the flow rates of one of the
refrigerants supplied to the heat exchangers, and an
operator manipulated set point for the quotient of (i)
the ratio of the flow rate of the liquefied natural gas
leaving the first heat exchanger to the flow rate of one
of the refrigerants supplied to the first heat exchanger
and (ii) the ratio of the flow rate of the liquefied

natural gas leaving the second heat exchanger to the flow
rate that refrigerant supplied to the second heat
exchanger.

17. The method according to claim 15, wherein steps 2),
3) and 4) comprise comparing the measured temperature of
the liquefied natural gas from the first heat exchanger
to the temperature of the liquefied natural gas from the
second heat exchanger; determining the stream having the
highest temperature; maintaining the flow rate of the
liquefied natural gas stream having the lowest
temperature at its operator manipulated set point;
determining a dependent set point for the flow rate of
the stream having the highest temperature, so as to
decrease the temperature of that liquefied natural gas
stream; and maintaining the flow rate of that stream at
its dependent set point.